Vortex laser measurement

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Fork gratings (Holograms)

grating #, OAM order, lines per mm
26A, OAM 1, 20 lpmm
2A, OAM 2, 15 lpmm
9A, OAM 3, 15 lpmm
10A, OAM 4, 15 lpmm
11A, OAM 5, 15 lpmm

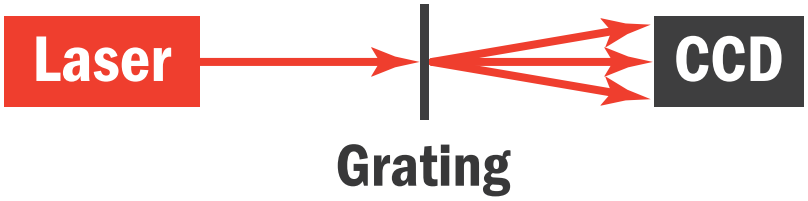
Fabricated by Nathan Clayburn at University of Nebraska-Lincoln

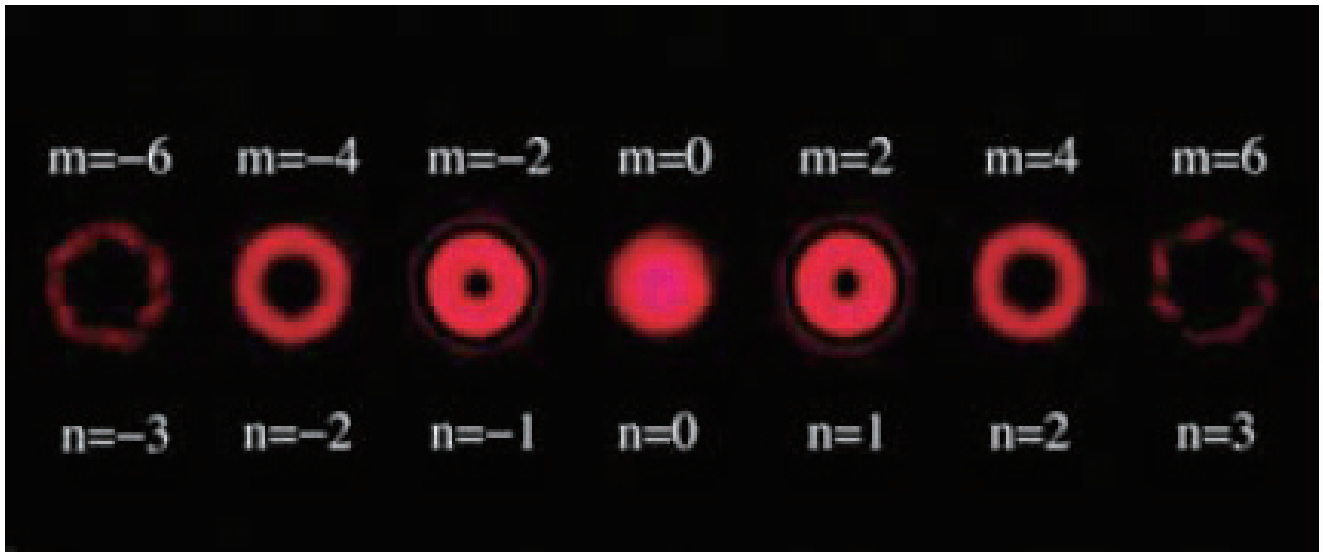
Comments from Nathan

I have a few gratings left over. I haven't done extensive testing on them, but I have no reason to believe there is anything wrong with them. I will send you 5 gratings in total. They will allow you to produce OAM beams of orders 1, 2, 3, 4, 5. I've also attached the relevant paper which describes how they were made and how they work.
Note that the gratings we used for the Phys. Rev. B had 20 lines per mm. Most of these new gratings only have 15 lines per mm (therefore they may be lower quality beams).

Vortex laser measurement

1. Diffraction pattern



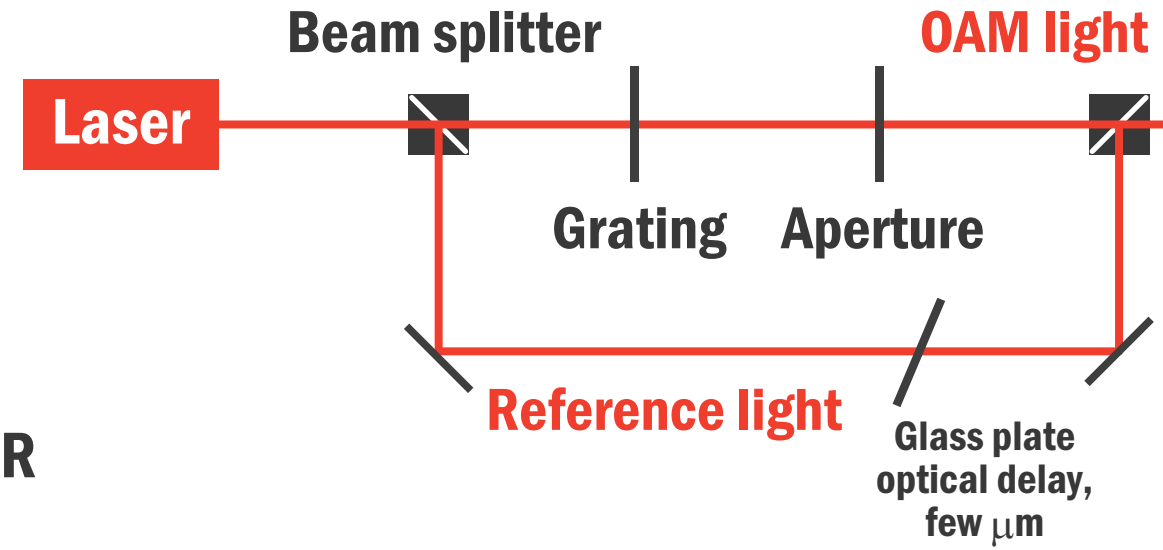


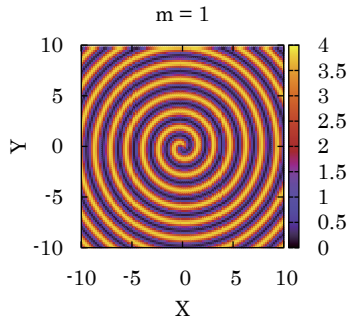
Check a contour and spatially separation of OAM light

A. V. Carpentier, Am. J. Phys. 76 (2008) 916.

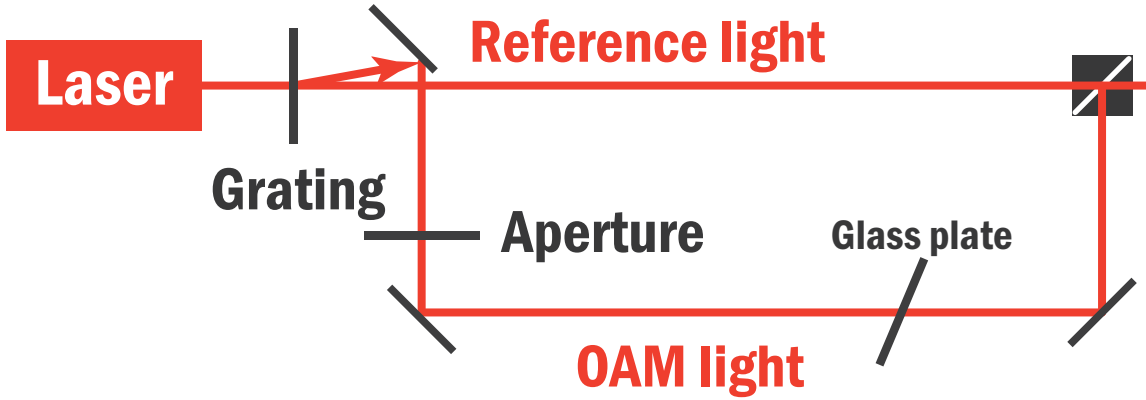
Vortex laser measurement

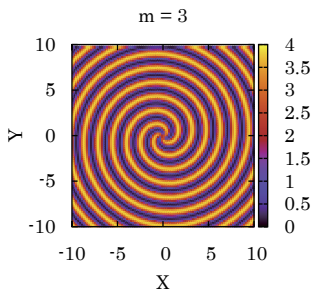
2. Interference pattern





OR





A. V. Carpentier, Am. J. Phys. 76 (2008) 916.
L. Paterson, Science 292 (2001) 912.

Tasks

1. Laser training: scheduled on May 19.
2. Observe gratings with an optical microscope.
3. Gather optical components for the measurement.
   Optical table, Laser (532nm, 1064nm), CCD camera,
   Camera software, Mirror, Beam splitter, Aperture,
   Lens, Glass plate, Holder, Mount, Base plate, etc
4. Secure a space for the measurement ($< 5\ m^2$).
5. Measurement and comparing with calculation.

Next step:

6. Theoretical investigation of Fabry-Perot cavity with OAM light.
7. Geant3 or EGS5 or other code simulation for OAM gamma ray generation and measurement.